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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,154	01/27/2005	Stefano Olivieri	IT 020022	8389

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EXAMINER	
VLAHOS, SOPHIA	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,154	OLIVIERI, STEFANO	
	Examiner	Art Unit	
	SOPHIA VLAHOS	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☒ Claim(s) *2-5 and 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/21/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings (Figures 1, 3-5) are objected to because they contain unlabeled boxes that should be provided with descriptive text labels. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 2-5, 7 are objected to because of the following informalities:

Claim 2 recites (lines 6-7): "…so that related parity symbols and information symbols…" what are related parity symbols? Claim 5 also mentions related symbols.

Claim 3 recites (line 3): "cascaded behind the pre-encoding…" should be "cascaded after".

Claim 4 recites (line 1 after the preamble): "…from **the** information symbols;" this should be ""…from information symbols" since there information symbols are not mentioned previously. (Lines 3-4) recite: "with a predetermined interleaving that protects…" should be "with a predetermined interleaving **scheme** that protects…".

Claim 5 recites (line 3 after the preamble): "… addresses used…" should be "…memory addresses…".

Claim 7 (line 8 after the preamble) recites: "read…" this should be "reading" since it is a step in a method.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 2, 5-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 2 recites (lines 2-3) : ", the parity symbol generator writing the parity

symbols into the interleaving memory….". However, the specification, specifically ¶29 of Patent Application Publication 2005/0283710 of the instant application, reads "…at least parity bits are supplied to the data input of the first port of memory 30…." and "First addressing unit supplies addresses fro storing these parity bits….". This is contrary to the claimed limitation ", the parity symbol generator writing the parity symbols into the interleaving memory….". Since the parity bits (or symbols) are only supplied to the input of the memory 30 and it is the first addressing unit that supplies address locations used in the writing process, i.e. it controls the writing.

Lines 4-5 of claim 2 recite: "…writing and mapping being coordinated to result in interleaving….." but in ¶29 (end of) and ¶33 it is the reading and mapping of the parity bits that results into interleaving and not the writing and mapping as claimed.

Claim 5, recites (lines 4-5): "…addresses used during writing and mapping defining an interleaving scheme…." but in ¶29 (end of) and ¶33 it is the reading and mapping of the parity bits that results into interleaving and not the writing and mapping as claimed.

Claim 6 recites: "a control unit for dynamically indicating a coding rate that has been used fro encoding the transmission signal" not disclosed by the specification since ¶ 39 of the specification reads: "Rate control unit **546** signals to de-interleaver **542** which locations have to be skipped or filled with dummy bits, because the corresponding parity bits have been suppressed by puncturing."

Claim 6, recites (line 4-6 after the preamble): "… the demodulator writing the demodulated information into the memory according to a coding rate independent address scheme, skipping locations for parity bits that the control unit indicates to have been suppressed by puncturing ;" Again, ¶ 39 of the specification the demodulator supplies the demodulated information and it is the de-interleaver that writes and reads from the memory to perform deinterleaving, based on information received from the rate control unit 546.

Furthermore claim 6 recites (lines 5-6): "...according to a coding rate independent address scheme, skipping locations for parity bits that the control unit indicates to have been suppressed by puncturing."

And the specification ¶ 39 reads: "A predetermined de-interleaving scheme is used, independent of the rate of puncturing, using dummy bits at the positions of parity bits that have been punctured." This sentence is contradictory since the predetermined de-interleaving scheme is dependent (not independent as stated in the above excerpt of ¶ 39) of the rate of puncturing, when dummy bits are used at the positions of parity bits that have been punctured. Furthermore ¶ 39 only mentions "a rate of puncturing" not "a coding rate" therefore "a coding rate independent address scheme" was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 7 recites limitations similar to those of claim 6 and is also rejected using the same rationale.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al. (U.S. 6,744,744) in view of Dötsch et al. (U.S. 6,513,140) and Zhang (U.S. 6,968,494).

With respect to claim 1, Tong et al., disclose: an encoder for encoding information according to an error protecting code (Fig. 5, see combination of blocks 90, the channel interleavers, and rate matching "turbo encoder" see convolutional coders, column 10, lines 18-21); a control unit for determines a coding rate that is to be used by the encoder (not shown in Fig. 3, circuit out of which "P/R" signal is generated determining whether repetition or puncturing is required in rate matching block 26 of Fig. 3, column 7, lines 65-67, column 8, lines 1-10, see column 3, lines 44-48, where the determined coding rate matches the data rate of the radio communications rate (depends on the available bandwidth), see also column 5, lines 14-26 and Fig. 5 where the puncturing performed by block 95 determines the coding rate), wherein the encoder comprises: an input for receiving information bits (Fig. 5, input data bits are supplied to the input of turbo coder, see column 10, lines 23-28); a parity bit generator for generating parity bits from the information bits (Fig. 5, see output of either encoder 1 P1 and/or encoder 2, P2, column 10, lines 23-28); an interleaving and puncturing unit (Fig.

5, channel interleavers and puncture block (also show in Fig. 3)) that interleaves the information bits and parity bits with a predetermined interleaving scheme for protection against burst errors in the transmission signal (column 10, lines 32-39, column 1, lines 53-55, where the interleaving protects against burst errors since it shuffles bits so that no single codeword is affected by burst noise and the receiver cannot decode it), the interleaving and puncturing unit puncturing the interleaved parity symbols subsequent to said interleaving, puncturing being controlled by the determined coding rate (see “P/R" control signal in rate matcher 26 as shown in Fig. 3, and Fig. 5, see column 3, lines 45-46, column 5, lines 14-26, column 10, lines 44-55, where the puncturing is controlled by the “P/R” based on the determined coding rate that matches the data rate (air rate)).

Tong et al. do not expressly teach: a modulator for modulating information from the encoder in a transmission signal; symbols; dynamically selecting a coding rate; puncturing being controlled dynamically by the selected coding rate;

In the same field of endeavor (RF communications), Dötsch et al. disclose: a modulator for modulating information from the encoder in a transmission signal (see column 7, lines 13); symbols (Fig. 1 turbo encoder , input U comprises unencoded symbols and R1 and R2 are redundancy symbols see Fig. 2 and column 6, lines 18-67, through column 7, lines 19);

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Tong et al. based on the teachings of Dötsch et al so that turbo encoding is performed on symbols (groups of bits). Also at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Tong et al. so

that a modulator (is used) for modulating information from the encoder in a transmission signal, so that the information signal is modulated onto a property (frequency, phase, amplitude, polarization etc.) of a carrier signal i.e. the information signal is converted into a suitable format for transmission.

In the same field of endeavor (data communications), Zhang discloses: a control unit for dynamically selecting a coding rate that is to be used by the encoder (Fig. 1, block 110 adaptive controller selecting a coding rate of the puncture encoder block 112, see column 2, lines 45-55, column 3, lines 6-11, 44-64); puncturing being controlled dynamically by the selected coding rate (see column 2, lines 45-65, column 3, lines 44-64 where the puncturing is adaptive (dynamic) based on a channel quality measure).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Tong et al. based on the teachings of Zhang so that an appropriate coding rate is selected based on a channel quality measure and a number of error correcting bits is adaptively adjusted (by control of the puncturing) in response to the channel quality measure to avoid unnecessary overhead for the receiver (Zhang column 1, lines 31-35).

With respect to claim 3, Tong et al., disclose: wherein the parity symbol generator comprises a first convolution encoder (see Fig. 5, “encoder 1” block 92, see column 10, lines 23- 27) and a pre-encoding interleaver coupled to the input (Fig. 5, “interleaver” block 91) and a second convolution encoder cascaded behind the pre-encoding interleaver (Fig. 5, “encoder 2” cascaded behind block 91), the interleaving

and puncturing unit comprising a first post encoding interleaver, coupled to interleave the information symbols and an output of the first convolution encoder (Fig. 5, circuit portion comprising channel interleavers 93 for S and P1 corresponds to the claimed first post encoding interleaver), and a second post-encoding interleaver coupled to interleave an output of the second convolution encoder (Fig. 5, block 93 interleaver of P2), separate from the first post encoding interleaver.

Method claim 4 is rejected based on a rationale similar to the one used to reject claim apparatus 1 above.

7. Claims 2 and 5 (as best understood) is rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al. (U.S. 6,744,744) in view of Dötsch et al. (U.S. 6,513,140) and Zhang (U.S. 6,968,494) as applied to claims 1 & 5 above, and further in view of Farrell et al. (U.S. 6,643,331).

With respect to claim 2 (as best understood), Tong et al. Dötsch et al. and Zhang disclose: wherein the interleaving and puncturing unit comprises an interleaving memory (Fig. 3 see working memory 50), the parity symbol generator writing the parity symbols into the interleaving memory (Fig. 3, see input to memory 50, linear addressed write-in column 6, lines 15-17, column 10, lines 31-35 where the channel interleavers (for the P1, P2 parity symbols) function as the one shown in detail in Fig. 3); a subset of the generated and stored parity symbols being mapped to the modulation symbols (Fig. 3 of Tong et al. shows interleaving followed by puncturing (of interleaved data in the

FIFO memory 65) since puncturing deletes data (symbols(the punctured output 76 supplied to a modulator only includes a subset of the generated and stored data (of working memory 50)) a size of the subset being controlled dynamically by the selected coding rate (Fig. 3, "P/R" control signal supplied to selector 66 determines whether puncturing takes place dynamically in response to channel quality measure as taught by Zhang).

Tong et al. Dötsch et al. and Zhang do not expressly teach: the modulator mapping the parity symbols to positions in modulation symbols according to the locations at which the parity symbols have been written into memory; writing and mapping being coordinated to result in interleaving of at least the parity symbols so that related parity symbols and information symbols are mutually separated modulation symbols; the subset being defined by selecting the locations that are mapped to positions in the modulation symbols.

In the same field of endeavor, Farrell et al. disclose: the modulator mapping the parity symbols to positions in modulation symbols (Fig. 3 through Fig 5 showing turbo encoder, its associated buffer and the mapping to modulation (constellation) symbols, see column 3, lines 1-65).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tong et al. Dötsch et al. and Zhang based on the teachings of Farrell et al., so that the modulator maps the parity symbols to positions in modulation symbols according to the locations at which the parity symbols have been written into memory the rationale being the modulation symbols comprise parity

symbols (and information symbols as taught by Farrell). The symbol mapping is therefore clearly dependent on the initial writing of the symbols in the memory and the reading (that creates the interleaves symbols) as taught by Tong et al., as part of the process of mapping interleaved symbols into modulation symbols.

With respect to the limitations, writing and mapping being coordinated to result in interleaving of at least the parity symbols so that related parity symbols and information symbols are mutually separated modulation symbols; the subset being defined by selecting the locations that are mapped to positions in the modulation symbols., the system obtained by modifying Tong et al. Dötsch et al. and Zhang based on Farrell et al, discloses the above limitations. See that interleaving is applied to information and parity symbols (Fig. 5 of Tong et al.) and the modulator such as the one taught by Farrell e. al., creates modulation symbols using information and parity pairs (Table 1 on column 3) with related parity symbols and information symbols distributed over mutually separated modulation symbols (see Table 1 of Farrell where information/parity (d1p1 & d2q2) are paired to create constellation points). Finally with respect to the subset being defined by selecting the locations that are mapped to positions in the modulation symbols, the subset referring to the subset of parity symbols (since the generated parity symbols are punctured, therefore a subset remains after puncturing) see column 8, lines 8-10 of Tong et al., where the punctured symbols are supplied to a buffer, and it is understood that the modulator accesses (selects) the buffer locations to generate the modulation symbols.

Claim 5 (as best understood) is rejected based on a rationale similar to the one used to reject claim 2 above.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shiu et al. (U.S. 6,798,826)

Kim et al. (U.S 7,050,410)

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is (571)272-5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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